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ABSTRACT

Administrators object to computers for two basic reasons: a refusal to face the problem of computer use and a refusal to pay for computers. Better understanding of what the computer can do helps solve these problems. Students' fears of depersonalization via use of computers must also be dealt with. Possible applications of computers include record storage, use in efficient decision making, computer-assisted instruction, and scheduling. As educators come to understand that computers are simply tools to facilitate teaching and learning, and as they gradually use computers to free themselves of mundane tasks, they also will face new problems, such as the moral and ethical consequences of the policies they choose to implement. The computer itself is neutral, without emotions. The administrator must remember that neither programers nor computers can be decision-makers. Decisions remain the responsibility of the administrator. (JK)

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THE COMPUTER: AN ADMINISTRATIVE DILEMMA

Jerald D. Floyd

INTRODUCTION

If administration in an educational setting is a process of managing and conducting a program of activities that facilitate the teaching and learning process, then it follows that the administrator should be aware of and employ any information source that will enhance this process. Rapid advances in the area of science and technology, including many new types and sources of information, have produced changes in almost every aspect of life. Although for the administrator most of the advances have certain beneficial effects, they have also brought with them additional problems. The benefits are immediately apparent if one observes the number of labor saving, pleasure producing devices developed in the last decade. But one of the problems is simply to keep up enough with the advancing science and technology explosion to identify those advances that would facilitate the teaching and learning in his institution. Certainly if he is not doing this, his effectiveness as an administrator is not what it might be. To aid the burdened administrator, then, this review will present an overview of the applications of the computer relating to the facilitation of teaching and learning in educational programs.

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ORIENTATION

Computers are now being widely used in colleges and universities as well as in the business community. Unlike the computer specialist, the academic administrator must have an understanding of varied and diverse areas. The administration of educational programs has developed into a job of unprecedented complexity. The use of the computer will not make the administrator's job easier or any less complex, but it can be a valuable aid in the decision-making process. "Decision making is a major concern of school administration. The secret of effective decision making is, in large part, having the right information about the problems at hand (10:41)." The computer often can provide the right information at the right time.

The opponents of computerization are not few in number and they are usually quite verbal about their objections. From an administrator's point of view, Caffrey and Mosmann (2) believe that such opposition boils down to two hardcore reasons: first, a refusal to face the problem of computer use and, second, a refusal to pay for its solution. The first objection, many times, is based on a lack of understanding of what computers can do and what they cannot do. On the other hand, some administrators have jumped on the computer bandwagon and promptly fallen off. Obviously when one expects fantastic results from a new computer application and the computer has been directed to do something which is hurriedly and poorly planned or beyond its capabilities, the outcome is going to be considerably less satisfactory than expected. Yet, as a consequence, the unknowing administrator may well develop a hostile attitude toward computer use.

The second objection, refusal or inability to pay for its solution, has an apparent financial basis. Computer rentals may range from $500 to $250,000 a month, figures that do not include the personnel required for operation. But not all of the refusal to pay is of a fiscal nature. The price may only be willful ignorance, an unwillingness to pay the necessary price to become informed. The administrator must be informed about the many component aspects that go into efficient and effective utilization of the computer, including its capabilities and limitations, what happens between the input of data and the ultimate output, and the data processing alternatives that exist. More about this in the philosophy of application section.

From a student's point of view, the major objection to the computer is depersonalization--the production of the "don't fold, staple, or mutilate" syndrome. Even when IBM cards carry their names rather than numbers the feeling of "all I am is a number or a card," is easily developed. All such opposition has some basis and needs to be dealt with. Administrators need to have an understanding of the capabilities of computers. This understanding takes effort and must be translated to tax payers, staff, and students in meaningful ways. The most meaningful, and the only valid application of computers in an educational setting is that application which facilitates teaching and learning.

The first computers were conceived and built at universities, and many of the present and future developments will occur there. Development has been rapid--in 1950, there was not a college with a commercial computer, by 1960 fewer than 150 campus computers could be counted, and by 1966, the number exceeded 600 (2). It is probable that in the not too distant future all colleges and universities will either own, rent, or

have ready access to a computer. We had best prepare to apply them to the facilitation of the processes in education.

Effective application of the computer to educational programs is contingent upon a basic understanding of how it operates. The computer has been described as a "big black box" that can perform arithmetic operations at very high rates of speed. However, the modern computer is something more than this. It may operate on a simple "yes" or "no" principle, but its extended capabilities can handle a countless number of such combinations. The computer can perform a sequence of instructions, take account of the results at critical points in an operation, and then modify its own instructions in accordance with the logical rules laid down by its user. These capabilities require considerable thought for full appreciation of its possibilities. If the computer is wisely utilized, it can become something much more than a speedy arithmetic calculator.

Application of this simple "yes-no" combination can be extended beyond the performance of simple mathematical functions to the execution of logical comparisons between two facts. It then becomes possible to prescribe what will be done next based on the findings of each comparison. Not unlike an everyday situation in which an administrator instructs his secretary to set up a committee meeting: "Ask the committee members if they can meet today. If they say 'yes' set a time in the afternoon. If they say 'no' ask about tomorrow," and so on and so forth. The secretary's action does not require a decision on her part. So it is with the computer. It is told what decisions to make, but unlike the harried secretary it can make them in enormous quantities. The vast number of "yes-no" questions required for scheduling classes for several thousand students provides an example of the sort of process for which the computer

is ideal. Once logical comparisons are defined and prescriptions established for needed actions on the alternatives (creation of a program), the computer can be used to assist in schedule development. It can make predetermined decisions. It may not be able to handle the entire job, but it can certainly count students, compare classes and teaching stations to avoid conflicts, and perform many other simple and time consuming tasks at an extremely high rate of speed.

SOME APPLICATIONS

Beard (1) in an article, "Computer Justified Decisions in Education," sees an obvious application of these computer capabilities in the area of justifying decisions concerning existing school programs. The current pressure by lawmakers, citizens, and students is demanding such evaluation. A computer memory bank could be created and stored with such information as the number of classes offered, the composition of such classes, and the academic and non-academic personnel involved, along with an inventory of the equipment and facilities, and other pertinent data. Beard feels that:

> Expediency necessitates that most decisions in education be made without needed revelant information. Any data is needed and revelant if without it the decision made will be altered in any form. The shortcomings of pragmatic efficiency and other effects that contaminate the decision-making of administrators and educators can be partially avoided through utilizing a well designed system of data storage and retrieval (1:33).

The creation of such an information source can be expensive in terms of money, time, and effort; however, decisions concerning the application of such a system should be based on potential and actual worth of the information derived from the data bank: is it worth the cost to reduce operating

expenses and energy output and to increase the efficiency of teaching and learning.

An article by Mitchell (13) described the use of the computer as an aid by a giant organization. The Modern Language Association. The application was to the periodic updating and printing of its international bibliography, a task that had taken months, sometimes years, for updating and printing the hundreds of thousands of literary entries. Through the use of the computer, program production time was cut by three months and cost by twenty percent. Equally important was the fact that the information got into the hands of those who needed it before, not after, it became outdated. Think of the efficiency in decision-making if the administrator, like the modern language scholar, had at his disposal a bibliography and print out of pertinent studies dealing with his problem area. Facilities already exist that he can use--including the computer stored dissertation information at the University of Michigan, the curriculum resource materials generated at the University of Buffalo, and the Educational Resource Information Center (ERIC) of the U. S. Office of Education. But how many administrators utilize even these?

Another potential area for computer use is computer assisted instruction (CAI). The administrator in any educational program is going to be forced to make decisions concerning CAI in the programs under his control. There are several problems associated with CAI where possible dangers can be identified. One is that personnel programing courses of study may misinterpret the appropriate course content or reinforce and extend unfortunate effects of poor courses and texts. Such can happen because of the rapid and easy duplication and distribution of educational materials through the use of computerization. Another problem is the possible loss

of faculty and student individuality and creativity if CAI is allowed to produce an assembly line method of education. Hicks, after cautioning administrators and educators, makes the following concluding statement:

> The CAI system is not a warm teacher or a loving parent. But once it has been taught how to deal constructively with individual intellectual differences, it can do so more rapidly and more patiently than can a person. And the teacher will find, if she is properly prepared to work with CAI as a versatile educational assistant, that she possesses a new outlet for her creative interest in her students (7:12).

Thus, it is possible, but by no means certain, that the computer can make contributions as an instructional modality. It will be the responsibility of administrators to insure that CAI applications embody creativity, patience, objectivity, and, most important, relevance to the educational process.

The future of CAI applications is enormous. If potentials are properly used, experts (8, 15, 17) believe that individualized instruction once possible only for a few can be available to all students at all levels. CAI offers the opportunity for 200 or more students during a portion of their school day to be working simultaneously and each be at a different point in the curriculum. Learning stations may range from the least complex--a modified typewriter that prints data in to and out of the computer--to a small booth installation that has not only typed communication modes but also auditory and visual capabilities. Suppes (15), writing in an article in the Phi Delta Kappan, is convinced that properly utilized CAI can individualize instruction by doing away with the lockstepping of students. It will free the teacher for personalized help for students while the computer allows others drill and practice time. He also feels that the pitfalls of standardization can be improved or eliminated. The sterility that standardization can bring to teaching and learning is a real problem, but the extensive use of computers can

permit almost unlimited diversity in curriculum and teaching. And to the final challenge that modern technology will make man a slave to machines, Suppes replies:

> Just as books freed serious students from the tyranny of overly simple methods of oral recitation, so computers can free students from the drudgery of doing exactly similar tasks unadjusted and untailored to their individual needs. As in the case of other parts of our society, our new and wonderous technology is there for beneficial use. It is our problem to learn how to use it well . . . There are too many adults among us who are not able to express their own feelings or to reach their own judgements. I would claim that the wise use of technology and science, particularly in education, presents a major opportunity and challenge. I do not want to claim that we know very much yet about how to realize the full potential of human beings; but I do not doubt that we can use our modern instruments to reduce the personal tyranny of one individual over another, wherever that tyranny depends upon ignorance (15:423).

A PHILOSOPHY OF APPLICATION

One final consideration is the administration of the computer itself. We have seen only a few of the capabilities of the computer in educational programs. In the final analysis, however, the administrator himself must make important decisions about which capabilities he wishes to utilize and what his priorities will be. McGraw (11) believes that problems of information processing are the product of our age and are becoming particularly evident in large public school systems and universities. One of the most important of these new problems is the collection and analysis of data to provide information needed in administration (10, 11). Fortunately, we have an array of appropriate tools, ranging from simple electro-mechanical devices to electronic digital computers. "Unfortunately, few administrators have been trained to use them; few administrators understand the tools' place in our society (11:7)." The computer is just that--a tool. A tool which can assist in the task of facilitating teaching and learning.

The administrator must therefore learn how to use these tools. Upon first introduction to the computer, the typical administrator sees a tool that is useful only in performing clerical functions (check writing, bookkeeping, and preparing printed lists). Many accept these functions but then relegate the computer to the accounting office. Some administrators, finding these functions a success, may then request more and more information. At this stage one finds himself with more information than he can read (print-out sheets produced at six hundred lines per minute). Such administrators are now ready for the next level of sophistication--the level of reduction and analysis of data. The wise administrator begins to search the information for exceptions or problems that require his attention. He now can instruct the computer to locate such exceptions and problems, specifying in advance what is important and what should be overlooked. At the programmed decision-making level of development the administrator reaches the first real dilemma. He must answer some not-so-simple questions: "Does he really have a rational philosophy for his school system? Does he really have a program plan well enough defined that it can be reduced to the level of an automation process that will warn him of deviations? What is his reaction to greater rationalization (11:8)." Michael (12), in a prediction of the implications of computer technology for human behavior in organizations, has a theoretical answer to some of these questions. The computer relieves the administrator of minor burdens, but it will enormously increase the demands on him to wrestle with the moral and ethical consequences of the policies he chooses to implement. In the past it has been possible to avoid many of these issues by claiming we had too little information upon which to make decisions. With the new tools available we will be able to use this "out" less frequently.

> The top level manager and decision-making professional will have to seek intensively for wisdom all his life. He will have to be a perpetual student of the technique of rationalized decision making, to be sure, but even more of the humanities. If he is not wise--if he is unthinking or singleminded in his application of the computer--he will fail eventually and our society will fail through such leadership. But providing wise men in the numbers and at the rate needed is a challenge whose outlines we can see only dimly . . . but we must do more than hope (12:67).

Davis (5) in an article, "The Computer is Neutral," contributes some additional perspective to the problem. He believes that the computer offers many advantages, but it also has some severe limitations that need to be recognized and dealt with. Computers lack sensitivity; they possess no feelings or emotions. Although this is a valuable asset at times, it can also be a serious limitation. The computer's being "neutral" requires that the man programming it must account for all the moral, ethical, and emotional contingencies. It is evident then that the administrator must not only recognize the computer's potentials and limitations, but he must also make decisions as to who should instruct the computer what to do. The importance of such decisions lies in their capacity to influence the way men live. To allow the machine (or those who program it) to make the decisions determines that something other than the administrator holds the power. As computers become more sophisticated and as our problems become more complex, the temptations to allow computers to make the decisions increases. Administrators must keep in mind that programmers, the individual who understands the language to make the computer operate, usually do not have the breadth of experience nor the understanding to take into account all of the educational factors that might arise. While the language, logic, and assumptions basic to the computer are not easily acquired and are generally understood fully only by the programmer, the administrator must keep in mind that neither the programmer nor the computer

is the decision-maker. The administrator should always remember the proposition: "The computer never makes decisions. It carries them out (2:60)." Caffrey in Computers on Campus (a work all administrators should read) concludes his book with:

> The computer can be the most humanizing machine ever devised, it can also create confusion, misinformation, bad feelings, and deficits. The choice is not up to the machine, nor to the technical people who run it. It is up to the administrator who evokes the educational goals of the organization and who leads those around him to achieve them. The computer only amplifies and implements decisions made or approved by the president (2:184).

CONCLUSION

Computers are here, on campus, and they need to be understood and dealt with in order for us to benefit from their use. Certainly they can free administrators from the drudgery of mundane and repetitive tasks. Their scheduling capabilities are an excellent example. With the computer one can schedule or simulate the scheduling of a department's classes involving thousands of students in several minutes. Pupils can be assigned sections, hours, and rooms ten different times in half an hour. The administrator can study the master schedules and pick the one that comes closest to achieving the desired educational objective(s). It is evident that tremendous possibilities exist for administrators in education to utilize computer generated information toward the facilitation of teaching and learning. But in the end the role of the better-informed administrator is unchanged: not the computer, but he must assume responsibility for decision-making regarding programming, utilization, interpretation, and application of information supplied by the computer.

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